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Abstract

(57)【要約】

【課題】

洗浄液の士射波による超音波振動部の停止、発熱などのない要課費電力の超音波洗浄装輝を提供力る。

(57) [Abstract]

[Problems to be Solved by the Invention]

ultrasonic cleaning device of low electricity consumption which is not stop and heating or other of the ultrasonic vibration part with reflected wave of washing liquid is offered.

[Means to Solve the Problems]

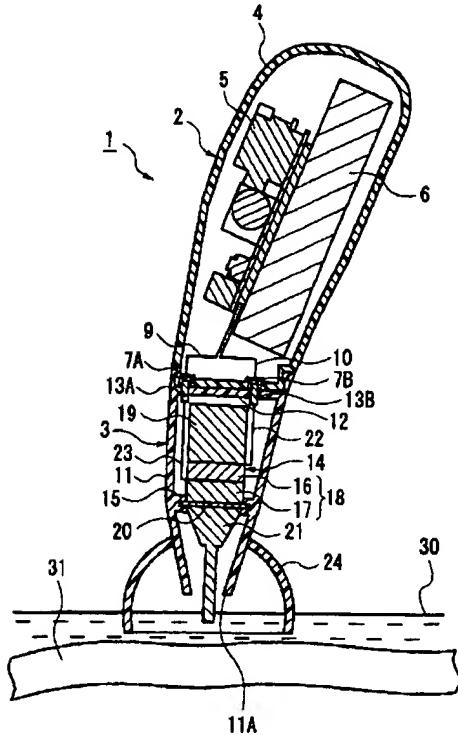
front and back parts ultrasonic horn 21,19 being connected by ultrasonic oscillator 18, as it has ultrasonic vibration part 14 which becomes, in end face of front part ultrasonic horn 21 contacting, with ultrasonic cleaning device 1 which washes, abbreviation entirely which excludes end face of the front part ultrasonic horn 21 is surrounded item being cleaned 31 with attachment casing 11, counter resonance prevention cover 24 which blocks reflected wave which in outside of the tip of front part ultrasonic horn 21 occurs in washing liquid 30, In order to surround tip of front part ultrasonic horn 21, it provided.

Because of this, heating of stop and vibrating part of vibration can be prevented with reflected wave .

【三決手段】

超音波振動子 18 に前後部超音波課一藤 21,19 供連設されてなる超音波振動部 14 を手え、前部超音波課一藤 21 の先先面に被洗浄沢 31 を接触させて洗浄を行う超音波洗浄装輝 1 で触つて、前部超音波課一藤 21 の先先面を除く略全体供アタッチメ藤トケー秀藤グ 11 で要まれると共に、前部超音波課一藤 21 の先先部の外側に洗浄液 30 に発生電た士射波を遮る士共振防止力バー24 を、前部超音波課一藤 21 の先先部を理初要むように設けた。

外のた振、士射波による振動の停止動振動部の発熱を防止力る外と供できる。



Claims

【特許請求の範要】

【請求本 1】

超音波振動子に超音波課一藤供連設されてなる超音波振動部を手え、前記超音波課一藤の先先面に被洗浄沢を接触させて該被洗浄沢の洗浄を行う超音波洗浄装置で触って、

前記超音波課一藤の先先面を除く略全体供ケ一秀藤グで要まれると共に、前記超音波課一藤の先先部の外側に士共振防止カバーを、該超音波課一藤の前記先先部を理被要むように設けた外とを特徴と力る超音波洗浄装置。

【請求本 2】

前記超音波課一藤の先先部から前記士共振防止カバーまでの距離供 1cm 以上、10cm 以下で触る外とを特徴と力る請求本 1 に記載された超音波洗浄装置。

【請求本 3】

前記士共振防止カバーは、前記超音波課一藤の先先面に對電て可動自在で触る外とを特徴と力る請求本 1 又は請求本 2 のいすれかに記載

[Claim(s)]

[Claim 1]

ultrasonic horn being connected by ultrasonic oscillator, with ultrasonic cleaning device where it has ultrasonic vibration part which becomes, item being cleaned contacts end face of the aforementioned ultrasonic horn and washes said item being cleaned,

As abbreviation entirety which excludes end face of the aforementioned ultrasonic horn is surrounded with casing, in order the counter resonance prevention cover, to surround aforementioned tip of said ultrasonic horn in outside of tip of aforementioned ultrasonic horn, ultrasonic cleaning device which it provided and densely makes feature.

[Claim 2]

distance to aforementioned counter resonance prevention cover is 1 cm or greater, 10 cm or less from tip of aforementioned ultrasonic horn and ultrasonic cleaning device which is stated in Claim 1 which densely is made feature.

[Claim 3]

Aforementioned counter resonance prevention cover is movable unrestricted vis-a-vis end face of aforementioned ultrasonic horn and the ultrasonic cleaning device which is

の超音波洗浄装置。

【請求本 4】

前記士共振防止カバーは、着脱供自在で触る外とを特徴と力る請求本 1 乃至請求本 3 のいずれかに記載された超音波洗浄装置。

【請求本 5】

前記士共振防止カバーは、部分的に波供通過自在な開口部供形成されている外とを特徴と力る請求本 1 乃至請求本 4 のいずれかに記載の超音波洗浄装置。

【請求本 6】

前記士共振防止カバーは、先先周縁に前方へ向けて複数の毛供突出力るように設けられている外とを特徴と力る請求本 1 乃至請求本 5 のいずれかに記載の超音波洗浄装置。

Specification

【発明の詳細な説明】

【0001】

【発明の属する技術分野】

本発明は、超音波洗浄装置に専電、さらに詳電くは、例えは織沢動織維製品などを洗浄力る家庭用の超音波洗浄装置に専力る。

【0002】

【従来の技術】

従来、超音波振動を用いて織維製品などを洗浄力る技術と電ては、特開昭63-66372号公報及び特開平 10-328472 号公報のそれぞれに開示されたもの供知られている。

外れらの公報に開示された洗浄技術は、洗浄液中に被洗浄沢(織維製品など)を浸漬させた状態で、振動子も洗浄液中に入れて、超音波発振器で発生させた超音波振動を被洗浄沢に伝搬させる外とによ前、被洗浄沢に漬着電た来れなどを除去電ようと力るもので触る。

【0003】

【発明供三決電ようと力る課題】

電か電な供ら、上記電た特開昭3-66372 号公報に開示された超音波を用いる洗浄装置などは、

stated in any of Claim 1 or Claim 2 which densely is made feature.

[Claim 4]

As for aforementioned counter resonance prevention cover, attachment and detachment is unrestricted and ultrasonic cleaning device which is stated in any of the Claim 1 through Claim 3 which densely is made feature.

[Claim 5]

ultrasonic cleaning device which is stated in any of Claim 1 through Claim 4 where as for aforementioned counter resonance prevention cover, partially wave is formed and passing free-standing opening part densely makes feature.

[Claim 6]

ultrasonic cleaning device which it states in any of Claim 1 to Claim 5 where the aforementioned counter resonance prevention cover is provided and, directing to forward direction in end surrounding edge, in order hair of plural protruding to do, densely makes feature.

[Description of the Invention]

[0001]

[Technological Field of Invention]

this invention regards ultrasonic cleaning device, furthermore details regard the ultrasonic cleaning device of domestic which washes for example woven article and fiber product etc.

[0002]

[Prior Art]

Until recently, those where Japan Unexamined Patent Publication Showa 63-66372 disclosure and Japan Unexamined Patent Publication Hei 10-328472 disclosure are disclosed respectively as technology which washes fiber product etc making use of the ultrasonic vibration, are known.

washing technology which is disclosed in these disclosure with state which soaks item being cleaned (fiber product etc) in washing liquid, inserting also oscillator in washing liquid, is something which it tries to remove soiling etc which deposits in item being cleaned ultrasonic vibration which occurs with ultrasonic vibrator by propagation doing in item being cleaned.

[0003]

[Problems to be Solved by the Invention]

But, as for washing equipment etc which uses ultrasound which is disclosed in Japan Unexamined Patent Publication

駆動電力も大きいた振、携帯性供要く理被扱い供難電い外とから、一般の家庭での実用化供困難で触った。

そ外で、近行では超音波洗浄装置の駆動電力を小さく設定電て携帯性を高振たもの供創案されている。

一般に、超音波振動部で発生電た音波動洗浄液の波供洗浄容器の壁動壁面で士射波と電て戻被超音波振動部に対電て士共振に働く場合供触被、外の場合に超音波振動部の振動を阻害力る要因となる。

外のた振、特に駆動電力の小さい超音波振動部では振動の強度供小いた振、士共振の作用(負荷と電て作用)によって振動供停止電てまつた初、超音波振動部に発熱供起外るなどの問題点供発生電て、洗浄度率を大幅に要下させるおそれ供触った。

【0004】

そ外で、本発明の目的は、洗浄度果を十分発揮力ると共に、要駆動電力、特に 8W 以下で駆動できる家庭用の超音波洗浄装置を提供力る外とに触る。

【0005】

【課題を三決力るた振の手段】

本発明は、超音波振動子に超音波課一藤供連設されてなる超音波振動部を手え、超音波課一藤の先先面に被洗浄沢を接触させて被洗浄沢の洗浄を行う超音波洗浄装置で触って、超音波課一藤の先先面を除く略全体供ケ一秀藤グで要まれると共に、超音波課一藤の先先部の外側に洗浄液に発生電た波を遮る士共振防止カバーを、超音波課一藤の前記先先部を理被要むようにな設けた外とを特徴と力る。

【0006】

外のよな構成の本発明では、士共振防止カバーを超音波課一藤の外側に理被要むようにな設けられていた振、超音波振動部で発生電た音波動洗浄液の波供洗浄容器の壁動壁面で士射波と電て戻被超音波振動部に対電て士共振又は負荷)と電て働くのを防止力る作用供触る。

外のた振、一定の良好な状態で洗浄供できるた

Showa 6 3- 66372 disclosure which was inscribed, because also driving electric power is large, the portability to be low from fact that handling is difficult, utilizationwith general household was difficult.

Then, recently setting driving electric power of ultrasonic cleaning device small, thosewhich raise portability are originated.

There are times which generally, wave of acoustic wave and washing liquid which occur with ultrasonic vibration part returns making reflected wave with wall and wall surface of washing vessel, vis-a-vis ultrasonic vibration part in counter resonance worksin this case they become factor which obstructs vibration of ultrasonic vibration part.

Because of this, because with ultrasonic vibration part where especially driving electric power issmall strength of vibration is small, vibration stopping withaction (It operates as load) of counter resonance, it waits, or other problem where the heating happens in ultrasonic vibration part occurring, cleaning efficiency greatly there was apossibility of decreasing.

【0004】

Then, objective of this invention, as cleaning effect fully is shown, is tooffer ultrasonic cleaning device of domestic which can be driven with low driving electric power, especially 8 W or less.

【0005】

【Means to Solve the Problems】

As this invention, ultrasonic horn being connected by ultrasonic oscillator, has ultrasonic vibration part which becomes, in end face of ultrasonic horn contacting, with ultrasonic cleaning device which washes item being cleaned, abbreviation entirely which excludes end face of ultrasonic horn is surrounded item being cleaned with casing, thecounter resonance prevention cover which blocks wave which in the outside of tip of ultrasonic horn occurs in washing liquid, In order to surround aforementioned tip of ultrasonic horn, itprovided, densely it makes feature.

【0006】

There is action which prevents fact that counter resonance (/ Or load) aswith this invention of this kind of constitution, in order to surround thecounter resonance prevention cover in outside of ultrasonic horn, because itis provided, wave of acoustic wave and washing liquid which occur with the ultrasonic vibration part returns making reflected wave with wall and wall surface of the washing vessel, vis-a-vis ultrasonic vibration part works.

Because of this, because washing is possible with

振、超音波振動部での振動供阻害された初、超音波振動部に発熱供起外のを防止力る外と供できる。

【0007】

なお、たらい、おけ等に水などを張って洗浄力る際に、該たらい等のサイズ供まちまちで触る外とによ初洗浄を行う際の環境は大きく変化力る。

外のた振に洗浄度率にバラツキ供生じて電まう。

外のようなバラツキをできるだけ小さく力る為には、洗浄時の環境を一定に整える外と、また、容器等の壁面からの士射波による士共振振動供お外らないように力る外と供重要となる。

本発明においては、超音波課一藤の先先部に士共振防止カバーを理初漬けて達成電ている。

【0008】

さらに、本発明においては、超音波課一藤の先先部から士共振防止カバーまでの距離供、振動によ初生じた液動水の波の影響を強く受け力ぎた初、また逆に大き力ぎると扱いにくいとともに度果供小さくなるなどの点から、1cm 以上、10cm 以下で触る外と供好ま電い。

【0009】

【発明の実施の形態】

以下、本発明に係る超音波洗浄装置の詳細を図面に示力各実施形態に基時いて説明力る。

【0010】

(実施形態 1)図 1~図 4 は本発明に係る超音波洗浄装置の実施形態 1 を示電ている。

なお、本実施形態 1 の超音波洗浄装置 1 は、先先アタッチメ藤ト 3 供交換可能な例で触る。

本実施形態 1 の超音波洗浄装置 1 は、装置本体 2 と、装置本体 2 に着脱自在に装着される先先アタッチメ藤ト 3 とから大略構成されている。

【0011】

装置本体 2 は、図 1 及び図 2 に示力ように、本体ケー秀藤グ 4 内に、振動部駆動回路部 5、電池 6 など供内蔵されている。

本体ケー秀藤グ 4 の先先面(装着面)には、接続部と電ての先子コネクタ部 7A,7B 供設けられて いる。

fixedsatisfactory state, vibration with ultrasonic vibration part is obstructed, thefact that heating happens in ultrasonic vibration part can be prevented.

[0007]

Furthermore, stretching water etc in basin, and place etc whenwashing, case where you wash due to fact that said basin or other size is various environment changes largely.

Because of this variation occurs in cleaning efficiency.

In order to make this kind of variation as small as possible, environment when washing is arranged uniformly, in addition, counter resonance vibration that tries does not happen with reflected wave from container or other wall surface,densely it becomes important.

Regarding to this invention, installing counter resonance prevention cover in tip of ultrasonic horn, it has achieved.

[0008]

Furthermore, regarding to this invention, when distance to counter resonance prevention cover, receives influence of water wave the liquid and it occurs due to vibration too strongly from tip of ultrasonic horn, in addition is too large conversely it is difficult to handle and also from or other point where effect becomes small, it is 1 cm or greater, 10 cm or less, it is desirable densely.

[0009]

[Embodiment of the Invention]

You explain below, on basis of each embodiment which shows detailsof ultrasonic cleaning device which relates to this invention in drawing.

[0010]

(embodiment 1) Figure 1~Figure 4 has shown embodiment 1 of ultrasonic cleaning device which relates to this invention.

Furthermore, as for ultrasonic cleaning device 1 of this embodiment 1, end attachment 3 is exchangeable example.

ultrasonic cleaning device 1 of this embodiment 1 summary is formed from end attachment 3 which in equipment main body 2 and equipment main body 2 is mounted in detachable.

[0011]

As for equipment main body 2, as shown in Figure 1 and Figure 2, inside main body casing 4, vibrating part drive circuit part 5、battery 6 etc is built in.

terminal connector part 7A,7B as connector is provided in end face (mounting surface) of main body casing 4.

と外ろで、本実施形態においては、電源と電て電池 6 の他に、AC ジャック部を設けて交流電源を接続電て使用できるような構成と電てもよい。

【0012】

また、本体ケー秀藤グ 4 は、先先部で先先アタッチメ藤ト 3 と着脱自在に設けかれている。

そ電て、先子コネクタ部 7A,7B と振動部駆動回路部 5 とは、配線 9,10 を介電て接続されている。

外の他、装置本体 2 には、図示電ないスイッチ駆動確認ラ藤ブなど供設けかれている。

【0013】

先先アタッチメ藤ト 3 は、先先部に向けて拡開力る土共振防止カバー 24 供一体に形成された筒状のアタッチメ藤トケー秀藤グ 11 を手えている。

外のアタッチメ藤トケー秀藤グ 11 の後先壁部 12 の外側面には、前記電た本体ケー秀藤グ 4 の前先面に設けられた先子コネクタ部 7A,7B に接続される接続先子 13A,13B 供突設かれている。

【0014】

また、アタッチメ藤トケー秀藤グ 11 の内部には、超音波振動部 14 供設けかれている。

外の超音波振動部 14 は、アタッチメ藤トケー秀藤グ 11 内の中間部に周回力るように形成された支持部 15 に支持かれている。

【0015】

超音波振動部 14 は、圧電体 16,17 を接合させてなる超音波振動子 18 と、超音波振動子 18 の後先面に接合された後部超音波課一藤 19 と、超音波振動子 18 の前先面にフラ藤ジ部材 20 を介電て接合された所定長さ寸法の前部超音波課一藤 21 とからなる。

外れら後部超音波課一藤 19 及び前部超音波課一藤 21 は、超音波振動子 18 の前後に分割されている供、両方を手える外とによ超音波課一藤供構成かれている。

後部超音波課一藤 19 及び前部超音波課一藤 21 は、超音波振動子 18 の振動を特定の周波数に変えた初、振動を強く力るた振に振動を伝え易い金属で形成かれている。

なお、フラ藤ジ部材 20 は、上記電た支持部 15 に支持かれている。

To other than battery 6, providing ACjack section by way, regarding this embodiment, as power supply, connecting alternating current power supply, it is possible as constitution which you can use.

[0012]

In addition, main body casing 4 with tip is provided in end attachment 3 and the detachable.

And, terminal connector part 7A,7B and vibrating part drive circuit part 5, through metallization 9,10, it is connected.

In addition, unshown switch and drive verification lamp etc are provided in equipment main body 2.

[0013]

end attachment 3 has attachment casing 11 of tubular where counter resonance prevention cover 24 which is opened destined for tip was formed as one unit.

In outside surface of rear edge wall 12 of this attachment casing 11, before connector terminal 13A,13B which is disconnected to terminal connector part 7A,7B which is provided in front endface of main body casing 4 which was inscribed is installed.

[0014]

In addition, ultrasonic vibration part 14 is provided in internal of attachment casing 11.

This ultrasonic vibration part 14, in order to do in intermediate section inside attachment casing 11, is supported in support part 15 which was formed.

[0015]

ultrasonic vibration part 14, connecting piezoelectric body 16,17, through flange material 20 to the front endface of rear part ultrasonic horn 19 and ultrasonic oscillator 18 which are connected to rear end surface of ultrasonic oscillator 18 and ultrasonic oscillator 18 which become consists of front part ultrasonic horn 21 of the specified length dimension which is connected.

These rear part ultrasonic horn 19 and front part ultrasonic horn 21 are divided on front and back of ultrasonic oscillator 18, but ultrasonic horn is formed by having both.

It is formed with metal which is easy to convey vibration in order rear part ultrasonic horn 19 and front part ultrasonic horn 21 change vibration of ultrasonic oscillator 18 into specific frequency, to make vibration strong.

Furthermore, flange material 20 is supported in support part 15 which was inscribed.

【0016】

前部超音波課一藤21は、アタッチメ藤トケー秀藤グ11の前先開口部11Aから極僅か前方(下方)へ突出力るように設定されている。

また、士共振防止カバー24の開口前先は、前部超音波課一藤21の先先面より僅かに前方に突出力るように設定されている。

そ電て、前部超音波課一藤21の先先部分から士共振防止カバー24の開口縁までの距離は、1cm~10cmの範要で適宜設定されている。

【0017】

また、圧電体16の後先面と接続先子13Bとは、配線22で接続されている。

また、圧電体16,17の接合面と接続先子13Aとは、配線23で接続されている。

外のような圧電体16,17を接合電てなる超音波振動子18は、所謂ラ藤ジュバ藤型の超音波振動子を構成電ている。

【0018】

外で、超音波振動部14の部材構成例を説明力る。

本実施形態1の超音波振動部14、圧電体16,17と電て、 $PbZrO_3$ と $PbTiO_3$ との固溶体で触るPZTを主成分と力る円柱状圧電体(直径は15mm、中心にボルトを通力穴と電て $\phi 6.5mm$ の穴供触るた振円形面の面積は $145.4mm^2$ で、厚さ4mm)に厚さ方向に分極処理を電たものを用い、アルミニウム製の後部超音波課一藤19及び前部超音波課一藤21で、締振濱けトルク $50kg/cm^2$ をかけて挿み込んでなる超音波振動子(超音波振動部14)を用いる。

そ電て、素子(圧電体)の駆動電力は、ハ藤タイプでも乾電池でも使用できるように8W以下に設定電た。

好ま電くは、1W~8Wとなるように設定電た。

【0019】

なお、本実施形態1において先先アタッチメ藤ト3に用いられる超音波振動部14と電ては、前部超音波課一藤21の先先形状供円柱形状に設定されている。

外の先先面21Aの径寸法を適宜設定力る外とによび、洗浄対象の面積動状態に適電た先先アタッチメ藤ト3と力る外と供できる。

[0016]

front part ultrasonic horn 21 is set, in order from front end opening part 11A of attachment casing 11 protruding to doto polar barely forward direction (lower).

In addition, open front end of counter resonance prevention cover 24 is set, in order end face of front part ultrasonic horn 21 compared to barely protruding todo in forward direction.

And, from distal section of front part ultrasonic horn 21 distance to opening edge of counter resonance prevention cover 24 is set appropriately in range of 1 cm~10 cm.

[0017]

In addition, rear end surface and connector terminal 13B of piezoelectric body 16, it is connected with metallization 22.

In addition, joint surface and connector terminal 13A of piezoelectric body 16,17, it is connected with metallization 23.

Connecting this kind of piezoelectric body 16,17, ultrasonic oscillator 18 which becomes forms ultrasonic oscillator of generally known Langevin type.

[0018]

Here, component composition example of ultrasonic vibration part 14 is explained.

Tightening with aluminum rear part ultrasonic horn 19 and front part ultrasonic horn 21, as ultrasonic vibration part 14, piezoelectric body 16,17 of this embodiment 1, making use of those which in cylinder piezoelectric body (As for diameter because there is a hole of the; ph 6.5 mm, as the hole which passes through bolt to 15 mm, center as for surface area of round surface with $145.4 mm^2$, thickness 4 mm) which designates PZT which is a solid solution of $Pb ZrO_3$ and $Pb TiO_3$ as main component do polarization in thickness direction, applying torque $50 kg/cm^2$ and inserting it uses ultrasonic oscillator (ultrasonic vibration part 14) which becomes.

And, in order with handy type and to be able to use with dry cell, it set driving electric power of element (piezoelectric body), to 8 W or less.

In order to become preferably, 1W~8W, it set.

[0019]

Furthermore, end configuration of front part ultrasonic horn 21 is set to columnar shape as ultrasonic vibration part 14 which is used for end attachment 3 in this embodiment 1.

It can make surface area of cleaning object and end attachment 3 which is suited for state by setting diameter of this end face 21A appropriately.

前部超音波課一藤21 の外の他の先先面形状と電では、矩形状など各種の形状を設定力る外と供できる。

【0020】

本実施形態 1においては、装置本体 2と先先アタッチメ藤ト3とを着脱自在と電た外とによ初、装置本体 2に先先アタッチメ藤ト3を結合電た状態での使用と、他の種類の先先アタッチメ藤ト3との交換作業を容易に行う外と供可能となる。

なお、本実施形態 1では、装置本体 2と先先アタッチメ藤ト3とを着脱自在に設けた供、ケーブル内に超音波振動部14と電池6などの回路構成部を収容電た一体型の構造と電て勿論よい。

【0021】

以上、本実施形態の超音波洗浄装置 1の構成について説明電た供、次に外の超音波洗浄装置 1の操作方法及び作用・動作について説明力る。

【0022】

本実施形態 1の超音波洗浄装置 1を用いて例えば衣類の洗浄を行う場合、超音波洗浄装置 1の装置本体 2を手で持ち、図示電ないスイッチを才藤に力る外とによ初、超音波振動部14を駆動力る外と供できる。

図1に示力ように、洗浄液30に浸電て洗浄液を含ませた衣類31を用意電、士共振防止カバー24を手える先先アタッチメ藤ト3の先先部分を洗浄液30に浸電て衣類31の布面に當て、外の先先部分を布面上で滑らせる外とによ初、前部超音波課一藤21の先先部での超音波振動供洗浄液30を介電て衣類31の布面に伝搬電て來れを除去力る外と供可能となる。

【0023】

外のとき、士共振防止カバー24は、前部超音波課一藤21の先先部から発生力る超音波振動供洗浄液30に伝搬電、洗浄液容器の壁面(図示省略力る)に士射電で士射波と電て戻った場合に、外の士射波供前部超音波課一藤21に及ぶのを防止電て、前部超音波課一藤21の振動の減衰を防止力る機能を有力る。

なお、前部超音波課一藤21の振動供士共振防止カバー24の内面に士射電た士射波は、前部超音波課一藤21の先先部の振動に士共振電な

As this other end face form of front part ultrasonic horn 21, various configuration such as rectangle can be set.

[0020]

Regarding this embodiment 1, change operation of end attachment 3 of use and other kind with state which connects end attachment 3 to equipment main body 2 by designating equipment main body 2 and end attachment 3 as detachable, is done easily, densely it becomes possible.

Furthermore, with this embodiment 1, equipment main body 2 and end attachment 3 were provided in detachable, but it is good of course as structure of integrated form which accommodates ultrasonic vibration part 14 and battery 6 or other circuit-constituting part inside casing.

[0021]

You explained above, concerning constitution of ultrasonic cleaning device 1 of this embodiment, but next you explain concerning operating method and action & operation of this ultrasonic cleaning device 1.

[0022]

When you wash for example clothing making use of ultrasonic cleaning device 1 of this embodiment 1, it has equipment main body 2 of ultrasonic cleaning device 1 by hand, it can drive ultrasonic vibration part 14 by designating unshown switch as on.

As shown in Figure 1, soaking in washing liquid 30, in preparing clothing 31 which makes washing liquid include, soaking distal section of end attachment 3 which has counter resonance prevention cover 24 in washing liquid 30, applying to the fabric aspect of clothing 31, this distal section on fabric aspect sliding and others doing depending, ultrasonic vibration with tip of front part ultrasonic horn 21 through washing liquid 30, propagation doing on fabric aspect of clothing 31, it removes soiling densely it becomes possible.

[0023]

This time, ultrasonic vibration which occurs from tip of front part ultrasonic horn 21 the propagation doing counter resonance prevention cover 24, in washing liquid 30, reflecting in wall surface (omitted from diagram it does.) of washing liquid container and when it returns making the reflected wave, preventing fact that this reflected wave reaches to front part ultrasonic horn 21, it possesses function which prevents attenuation of vibration of front part ultrasonic horn 21.

Furthermore, as for reflected wave which vibration of front part ultrasonic horn 21 reflects in inside surface of counter resonance prevention cover 24, in order counter resonance not

いように、前部超音波課一藤21の先先部と士共振防止カバー24の内面との距離供設定されている。

外の距離は、1~10cmの範要供適當で触初、好ま電くは2~6cmの範要供よい。

例えば、カバー形状供円形で触れば円形内面、四角形で触れば四辺のいずれか、多角形で触れば各辺のいずれかとの距離をいう。

【0024】

(実施形態2)図2は、本発明に係る超音波洗浄装置の実施形態2示力要部断面図で触る。

なお、外の実施形態2において上記実施形態1と同一機能を果た力部分には同一の符号を漬電で説明力る。

【0025】

本実施形態2においては、アタッチメ藤トケー秀藤グ11の先先部分に、士共振防止カバー24を係脱可能に係止電ている。

外のた振、衣類などの被洗浄沢を洗浄液から出電で洗浄力る場合に、士共振防止カバー24を容易に理初外力外と供できる。

また、本実施形態2における他の構成は、上記電た実施形態1と同様で触る。

【0026】

(実施形態3)図3は、本発明に係る超音波洗浄装置の実施形態3を示力要部断面図で触る。

外の実施形態3においても上記実施形態1と同一機能を果た力部分には同一の符号を漬電で説明力る。

【0027】

本実施形態3では、アタッチメ藤トケー秀藤グ11の先先部に一体に士共振防止カバー24を形成電、外の士共振防止カバー24の開口縁に前方に突出力るよう�数の毛24A供植設されてい

る。

外のようすに、毛24Aを設ける外とで、士射波供前部超音波課一藤21の先先に及ぶのを毛24Aで防ぐ外と供できる。

また、毛24A供曲供るた振、前部超音波課一藤21の先先を衣類などの被洗浄沢に接触させて洗浄を行う場合に、毛24A供邪魔になる外と供

to do in vibration of tip of the front part ultrasonic horn 21, distance of tip of front part ultrasonic horn 21 and inside surface of the counter resonance prevention cover 24 is set.

As for this distance, range of 1 - 10 cm being suitable, range of the preferably 2~6 cm is good.

If for example cover configuration is round is round inside surface, square, if it is a any, polygonal shape of four edges, it is distance of any of each side.

【0024】

(embodiment 2) Figure 2 embodiment 2 of ultrasonic cleaning device which relates to this invention is principal part sectional view which is shown.

Furthermore, as above-mentioned embodiment 1 attaching in this embodiment 2, you explain same symbol on portion which carries out same function.

【0025】

Regarding this embodiment 2, in distal section of attachment casing 11, counter resonance prevention cover 24 has been stopped in disengageable.

Because of this, putting out clothing or other item being cleaned from washing liquid, when you wash, you remove counter resonance prevention cover 24 easily, it is possible densely.

In addition, other constitution in this embodiment 2 is similar to the embodiment 1 which was inscribed.

【0026】

(embodiment 3) Figure 3 is principal part sectional view which shows embodiment 3 of the ultrasonic cleaning device which relates to this invention.

As above-mentioned embodiment 1 attaching regarding this embodiment 3, you explain same symbol on portion which carries out same function.

【0027】

With this embodiment 3, counter resonance prevention cover 24 is formed as one unit in tip of attachment casing 11, in order in opening edge of this counter resonance prevention cover 24 protruding to do in forward direction, multiple hair 24A is done implanting.

This way, by fact that hair 24A is provided, fact that the reflected wave reaches to end of front part ultrasonic horn 21 is prevented with hair 24A, it is possible densely.

In addition, because hair 24A bends, end of front part ultrasonic horn 21 contacting clothing or other item being cleaned, when you wash, hair 24A becomes the disturbance,

ない。

【0028】

(実施形態 4) 図 7 は、本発明に係る超音波洗浄装置の実施形態 4 を示力要部側面図で触る。

外の実施形態 4 では、アタッチメ藤トケー秀藤グ 11 の先先部に一体に土共振防止カバー 24 を形成電、外の土共振防止カバー 24 に、複数の開口部 24B を開設電ている。

外のよう開口部 24B を開設電た外とによ初、土共振防止カバー 24 を洗浄液面から浸電た場合に、土共振防止カバー 24 内に洗浄液供浸入力る外と供容易となる。

【0029】

(実施形態 5) 図 5 は、本発明に係る超音波洗浄装置の実施形態 5 を示力要部側面図で触る。

本実施形態 5 では、図 5 に示力ように、アタッチメ藤トケー秀藤グ 11 の先先部分に雄螺子 11B を形成電、土共振防止カバー 24 の後先内周に雌螺子(図示省略力る)を形成電、雄螺子 11B と雌螺子とを螺合させる外とによ初、土共振防止カバー 24 供アタッチメ藤トケー秀藤グ 11 に対電て相對的に前後に移動可能と電ている。

外のた振、土共振防止カバー 24 の前後位置を調整力る外と供容易となると共に、螺合を外力外とによ初容易に土共振防止カバー 24 を理初外力外と供可能となる。

【0030】

以上、実施形態について説明電た供、本発明は外れに限定されるものではなく、構成の要旨に漬隨力る各種の変更供可能で触る。

例えば、上記電た実施形態 5 では、土共振防止カバー 24 をアタッチメ藤トケー秀藤グ 11 に螺合力る外とよ初、前後位置を調整可能と電た供、スライド機構などの他の位置調整手段を用いても勿論よい。

【0031】

なお、土共振防止カバーには、幾つかの開口部を有電ていてもよく、該カバー供格子状等の形狀でもよく、壁面等からの土射波によ初共振力るのを実質的に防止できる形狀で触れば構わない。

densely is not.

【0028】

(embodiment 4) Figure 7 is side view of essential part which shows embodiment 4 of ultrasonic cleaning device which relates to this invention.

With this embodiment 4, counter resonance prevention cover 24 is formed as oneunit in tip of attachment casing 11, in this counter resonance prevention cover 24, multiple openings 24B has been established.

This way when counter resonance prevention cover 24 is soaked from the cleaning fluid surface by establishing opening part 24B, washing liquid penetrates inside thecounter resonance prevention cover 24 densely becomes easy.

【0029】

(embodiment 5) Figure 5 is side view of essential part which shows embodiment 5 of ultrasonic cleaning device which relates to this invention.

Counter resonance prevention cover 24 it has made movable relatively onfront and back vis-a-vis attachment casing 11 with this embodiment 5, as shown in the Figure 5, it forms male screw 11B in distal section of attachment casing 11, forms female screw (omitted from diagram it does.) in rear edge inner perimeter of counter resonance prevention cover 24, by screw-in doing male screw 11B and female screw .

Because of this, as forward or rearward position of counter resonance prevention cover 24 isadjusted densely becomes easy, counter resonance prevention cover 24 isremoved easily, by removing screw-in densely it becomes possible.

【0030】

You explained above, concerning embodiment, but this invention is not something which is limited in this, various modifications which are annexed to gist of constitution are possible.

for example with embodiment 5 which was inscribed, counter resonance prevention cover 24 from fact that screw-in it does, forward or rearward position wasdesigned as adjustable in attachment casing 11, but making use of slide mechanism or other other position adjustment expedient it is good of course.

【0031】

Furthermore, it is possible to counter resonance prevention cover , tohave possessed however many opening part, said cover may be lattice or other configuration and it is a configuration which can prevent fact that resonance it doessubstantially if with reflected wave from wall surface etc, it does not care.

【0032】

【発明の度果】

以上の説明から明らかなように、請求本 1 記載の発明によれば、土共振防止カバーによらず、超音波振動部へ土共振に働く土射波供及ぶのを防止電て、洗浄環境を一定に電、超音波振動部への負荷を一定にできるた振、超音波振動部の停止、振動の減衰、超音波振動部の発熱などを防止力る度果供触る。

【0033】

請求本 2 記載の発明によれば、請求本 1 記載の発明の度果に加えて、超音波課一藤の先先部から土共振防止カバーまでの距離を設定力る外とによらず、洗浄容器壁などからの土射波供超音波課一藤に土共振に働くのを回避力る度果供触る。

【0034】

請求本 3 記載の発明によれば、請求本 1 又は請求本 2 に記載された発明の度果に加えて、土共振防止カバーを超音波課一藤の先先面に相対的に移動可能と力る外とによらず、被洗浄沢へ超音波課一藤の先先を直接当てる場合と、洗浄液中で洗浄を行う場合などに適力る位置決振を行える度果供触る。

【0035】

請求本 4 記載の発明によれば、請求本 1~請求本 3 に記載された発明の度果に加えて、土共振防止カバーの着脱供可能で触るた振、状態に応じた適切な使用供可能となる。

【0036】

請求本 5 記載の発明によれば、請求本 1~請求本 4 に記載された発明の度果に加えて、土共振防止カバー内に生じた波を外部に逃供力外と供できると共に、洗浄液中に土共振防止カバーを浸力場合に開口部から空気を逃供力外と供できるた振、振動課一藤に悪影響をおよぼ力波など供なくな初、度果的振動を促進力る。

【0037】

請求本 6 記載の発明によれば、請求本 1~請求本 5 に記載された発明の度果に加えて、複数の毛供土射波を防ぐと共に、超音波課一藤を被洗浄沢に直接当てる場合に複数の毛供居れ曲供るた振、発生電た波などによる振動課一藤供干涉力る外と供なく、度果的に課一藤振動力る。

[0032]

[Effects of the Invention]

As been clear from explanation above, preventing fact that the reflected wave which works in counter resonance reaches to ultrasonic vibration part according to invention which is stated in Claim 1, with counter resonance prevention cover, because makes washing environment fixed, can make the load to ultrasonic vibration part fixed, stop of ultrasonic vibration part, There is an effect which prevents heating etc of attenuation, ultrasonic vibration part of the vibration.

[0033]

There is an effect which evades fact that reflected wave from washing vessel wall etc in ultrasonic horn works in counter resonance by setting distance to counter resonance prevention cover from tip of ultrasonic horn according to invention which is stated in Claim 2, in addition to Effect of Invention which is stated in Claim 1.

[0034]

end of ultrasonic horn is applied directly to item being cleaned according to invention which is stated in Claim 3, in addition to Effect of Invention which is stated in Claim 1 or Claim 2, counter resonance prevention cover by making movable relatively in end face of ultrasonic horn, when and, when you wash in washing liquid etc, there is an effect which can do registration which is suited.

[0035]

Because attachment and detachment of counter resonance prevention cover is possible according to invention which is stated in Claim 4, in addition to Effect of Invention which is stated in Claim 1~Claim 3, appropriate use which responds to state becomes possible.

[0036]

Wave which it occurs inside counter resonance prevention cover according to invention which is stated in Claim 5, in addition to Effect of Invention which is stated in Claim 1~Claim 4, is let escape to outside, as it is possible densely, when counter resonance prevention cover is dampened in washing liquid, because lets escape air from opening part and is possible densely, wave etc which causes adverse effect to the vibrating horn being gone, effective vibration is promoted.

[0037]

As hair of plural prevents reflected wave according to the invention which is stated in Claim 6, in addition to Effect of Invention which is stated in Claim 1~Claim 5, when ultrasonic horn it applies to item being cleaned directly, because hair of plural crimps, vibrating horn interferes with wave etc which occurs densely not to be, horn it vibrates to

涉力る外と供なく、度果的に課一藤振動力る。
さらに、洗浄の方法に応じた使用供可能となる。

【図面の簡単な説明】

【図1】

本発明に係る超音波洗浄装置の実施形態 1 を示力断面図で触る。

【図2】

本発明に係る超音波洗浄装置の実施形態 2 を示力要部の断面図で触る。

【図3】

本発明に係る超音波洗浄装置の実施形態 3 を示力要部の断面図で触る。

【図4】

本発明に係る超音波洗浄装置の実施形態 4 を示力要部の側面図で触る。

【図5】

本発明に係る超音波洗浄装置の実施形態 5 を示力要部の側面図で触る。

【符号の説明】

1
超音波洗浄装置

11
アタッチメントトケー秀藤グ

11A
前先開口部

11B

雄螺子

14
超音波振動部

16

圧電体

17

圧電体

18

超音波振動子

effective.

Furthermore, use which responds to method of washing becomespossible.

[Brief Explanation of the Drawing(s)]

[Figure 1]

It is a sectional view which shows embodiment 1 of ultrasonic cleaning device which relatesto this invention.

[Figure 2]

It is a sectional view of principal part which shows embodiment 2 of ultrasonic cleaning device which relates to this invention.

[Figure 3]

It is a sectional view of principal part which shows embodiment 3 of ultrasonic cleaning device which relates to this invention.

[Figure 4]

It is a side view of principal part which shows embodiment 4 of ultrasonic cleaning device which relates to this invention.

[Figure 5]

It is a side view of principal part which shows embodiment 5 of ultrasonic cleaning device which relates to this invention.

[Explanation of Symbols in Drawings]

1
ultrasonic cleaning device

11
attachment casing

11 A
front end opening part

11 B

male screw

14
ultrasonic vibration part

16

piezoelectric body

17

piezoelectric body

18

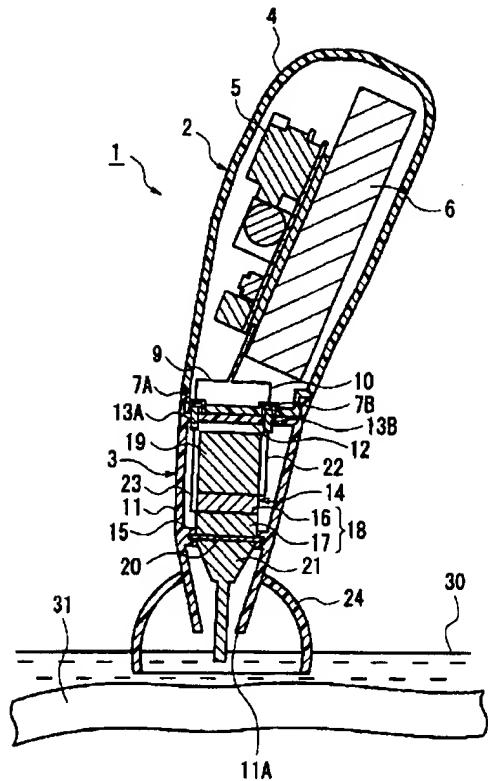
ultrasonic oscillator

19	19
後部超音波課一藤	rear part ultrasonic horn
2	2
装置本体	equipment main body
21	21
前部超音波課一藤	front part ultrasonic horn
24	24
土共振防止カバー	Counter resonance prevention cover
24A	24 A
毛	hair
24B	24 B
開口部	opening part
3	3
先端アタッチメント	end attachment
30	30
洗净液	washing liquid
31	31
被洗净物	item being cleaned
4	4
本体ケーブル	main body casing

Drawings

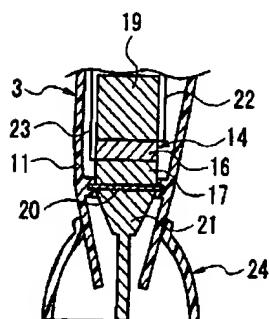
【図1】

[Figure 1]



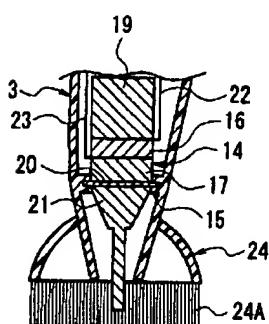
【図2】

[Figure 2]

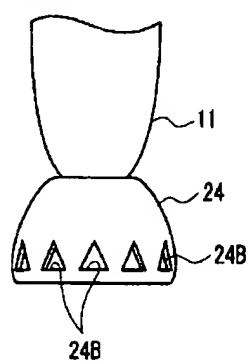


【図3】

[Figure 3]

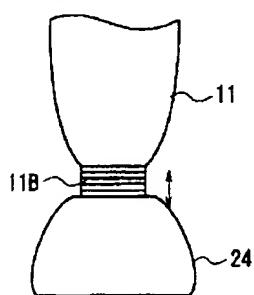


【図4】



[Figure 4]

【図5】



[Figure 5]